

Question 1 is compulsory and attempt any 5 out of remaining 6 questions

Question 1:

(A)

A firm needs a component in an assembly operation. If it wants to do the manufacturing itself, it would need to buy a machine for Rs. 4 lakhs which would last for 4 years with no salvage value. Manufacturing costs in each of the four years would be Rs. 6 lakhs, Rs. 7 lakhs, Rs. 8 lakhs and Rs. 10 lakhs respectively. If the firm had to buy the component from a supplier the component would cost Rs.9 lakhs, Rs.10 lakhs, Rs.11 lakhs and Rs.14 lakhs respectively in each of the four years.

However, the machine would occupy floor space which could have been used for another machine. This latter machine could be hired at no cost to manufacture an item, the sale of which would produce net cash flows in each of the four years of Rs. 2 lakhs; it is impossible to find room for both the machines and there are no other external effects. The cost of capital is 10% and P/V factor for each of the 4 years is 0.909, 0.826, 0.751 and 0.683 respectively.

Required

Should the firm **make the component or buy from outside?**

(5 marks)

(B)

Y-Connections, China based firm, has just developed ultra-thintablet S-5 with few features like the ability to open two apps at the same time. This tablet cost Rs. 5,00,000 to develop; it has undergone extensive research and is ready for production. Currently, the firm is deciding on plant capacity, which could cost either Rs. 35,00,000 or Rs. 52,00,000. The additional outlay would allow the plant to increase capacity from 500 units to 750 units. The relevant data for the life cycle of the tablet at different capacity level are as under:

Expected Sales	500 units	750 units
Sale Price	Rs.79,600 per unit	Rs.69,600 per unit
Variable Selling Costs	10% of Selling Price	10% of Selling Price
Salvage Value - Plant	Rs. 6,25,000	Rs. 9,00,000
Profit Volume Ratio	40%	

Required:

ADVISE Y-Connections, regarding the **OPTIMAL PLANT CAPACITY** to install. The tablet's **life cycle** is two years.

Note: Ignore the time value of money.

(5 marks)

(C)

The cost per unit of **transporting** goods from the factories X, Y and Z to destination A, B, C and D and the quantities demanded and supplied are given:

Factories	Destinations				Supply
	A	B	C	D	
X	25	50	20	25	100
Y	30	40	35	10	250
Z	20	10	25	35	200
Demand	250	100	150	50	550

Answer the following question with reasons taking u_3 as zero while calculating u_i & v_j :

- (i) Is this solution is optimum?
(ii) If yes, can there be any alternate optimum solution? **(5 marks)**

(D)

Century Electrical Company manufactures fans. As a first step to focus on quality improvements, the company has compiled the following operating data for the year ending 31.03.2018:

Cost of Quality	Amount in Rs.
Re-inspecting Rework	3,25,600
Training	3,75,500
Warranty Repairs	8,62,500
Line Inspection	2,12,500
Downtime	1,84,000
Design Engineering	3,62,800
Product Testing Equipment	4,15,800
Litigation cost to defend allegations of defective products	2,90,500
Recording and reporting defects	2,67,600
Supplier evaluation	2,96,800
Storing and disposing waste	1,72,000
Product liability insurance	1,08,000
Expediting	3,27,000
Procedure verification	2,54,000
Recalls	3,42,000

Required

Classify the costs into cost of quality categories and determine the total amount being spent on each category. **(5 Marks)**

Question 2:

(A)

XWB Ltd. has two divisions Division W and Division B. Division W produces product Z, which it sells to external market and also to Division B. Divisions in the XWB Ltd. are treated as profit centres and divisions are given autonomy to set transfer prices and to choose their supplier. Performance of each division measured on the basis of target profit given for each period.

Division W can produce 1,00,000 units of product Z at full capacity. Demand for product Z in the external market is for 70,000 units only at selling price of Rs. 2,500 per unit. To produce product Z Division W incurs Rs. 1,600 as variable cost per unit and total fixed overhead of Rs. 4,00,00,000. Division W has employed Rs. 12,00,00,000 as working capital, working capital is financed by cash credit facility provided by its lender bank @ 11.50%

p.a. Division W has been given a profit target of Rs. 2,50,00,000 for the year.

Division B has found two other suppliers C Ltd and H Ltd. who are agreed to supply product Z.

Division B has requested a quotation for 40,000 units of product Z from Division W.

Required

- (i) Calculate the **transfer price per unit** of product Z that Division W should quote in order to meet target profit for the year.
- (ii) Calculate the **two prices** Division W would have to quote to Division B, if it became XWB Ltd. policy to quote transfer prices based on opportunity costs. **(8 marks)**

(B)

Great Eastern Appliances Ltd. (GEAL) manufactures consumer durable products in a very highly competitive market. GEAL is considering launching a new product 'Kitchen Care' into the market and gathered the following data:

Expected Market Price- Rs.5,000 per unit

Direct Material Cost- Rs.1,850 per unit

Direct Labour Cost- Rs.80 per hour

Variable Overhead Cost- Rs.1,000 per unit

Packing Machine Cost (specially to be purchased for this product)- Rs.5,00,000

GEAL expects the selling price for the new product will continue throughout the product's life and a total of 1,000 units can be sold over the entire lifetime of the product.

Direct labour costs are expected to reduce as the volume of output increases due to the effects of **80% learning curve** (index is -0.3219). The expected time to be taken for the first unit is 30 hours and the learning effect is expected to end after 250 units have been produced. Units produced after first 250 units will take the same time as the 250th unit.

You are required to-

- (i) Calculate the **expected total labour hours** over the life time of the product 'Kitchen Care'.
- (ii) **Profitability** of product 'Kitchen Care' that GEAL will earn over the life time of the product.
- (iii) **Average target labour cost per unit** over the life time of the product if GEAL requires average profit of Rs. 800 per unit, to achieve its long term objectives.

Note: $250^{-0.3219} = 0.1691$, $249^{-0.3219} = 0.1693$

(8 marks)

Question 3:**(A)**

Generation 2050 Technologies Ltd. develops cutting-edge innovations that are powering the next revolution in mobility and has nine tablet smart phone models currently in the market whose previous year financial data is given below:

Model	Sales (Rs.'000)	Profit-Volume (PV) Ratio
Tab - A001	5,100	3.53%
Tab - B002	3,000	23.00%
Tab - C003	2,100	14.29%
Tab - D004	1,800	14.17%
Tab - E005	1,050	41.43%
Tab - F006	750	26.00%
Tab - G007	450	26.67%
Tab - H008	225	6.67%
Tab - I009	75	60.00%

Using the financial data, carry out a **Pareto analysis** (80/20 rule) of Sales and Contribution.

(8 marks)**(B)**

The number of days of total float (TF), earliest start times (EST) and duration in days are given for some of the following activities.

Activity	TF	EST	Duration
1-2	0	0	???
1-3	2	???	???
1-4	5	???	???
2-4	0	4	???
2-5	1	???	5
3-6	2	12	???
4-6	0	12	???
5-7	1	???	???
6-7	???	23	???
6-8	2	???	???
7-8	0	23	???
8-9	???	30	6

Required

- (i) Find ??? Figures.
- (ii) Draw the network.
- (iii) List the paths with their corresponding durations and state when the project can be completed.

(8 marks)

Question 4:**(A)**

A company is engaged in manufacturing two products M and N. Product M uses one unit of component P and two units of component Q. Product N uses two units of component P, one unit of component Q and two units of component R. Component R which is assembled in the factory uses one unit of component Q. Components P and Q are purchased from the market. The company has prepared the following forecast of sales and inventory for the next year:

	Product M	Product N
Sales (in units)	80,000	1,50,000
At the end of the year	10,000	20,000
At the beginning of the year	30,000	50,000

The production of both the products and the assembling of the component R will be spread out uniformly throughout the year. The company at present orders its inventory of P and Q in quantities equivalent to 3 months production. The company has compiled the following data related to two components:

	P	Q
Price per unit (Rs.)	20	8
Order placing cost per order (Rs.)	1,500	1,500
Carrying cost per annum	20%	20%

Required:

- (i) Prepare a **Budget** of production and requirements of components for next year.
- (ii) Suggest the **optimal order quantity** of components P and Q. **(8 marks)**

(B)

“North Garden” is an exclusive resort located in a famous Island of Pacific Ocean that vows to isolate its guests from the hustle and bustle of everyday life. Its leading principle is “all contemporary amenity wrapped in old-world charisma”. Each of the resort’s 18 villas has a separate theme like Castle, Majestic, Ambassador, Royal Chateau, Coconut, Lemon, Balinese etc and guests often ask for a specific villa when they make reservations. Villas are ideal for families or friends travelling together and these villas feature luxurious accommodation spanning two floors. Since it is located within a 300-acre estate on white sand beach, the resort offers its guests a wide variety of outdoor activities such as horseback riding, hiking, diving, snorkeling, sailing, golf and so on. Guests could also while away the day relaxing in the pool and availing themselves of the resort’s world-famous spa “Garden Spa”. The dining room, which only has three tables for the public, is acceptable proud of its 4-star rating.

Required

Develop a **balanced scorecard** for “North Garden”. It is sufficient to give two measures in each of the four perspectives. **(4 marks)**

(C)

Find the **dual problem** for the following: Minimize

$$Z = 2x_1 - 3x_2 + 4x_3$$

Subject to the constraints

$$\begin{aligned}3x_1 + 2x_2 + 4x_3 &\geq 9 \\2x_1 + 3x_2 + 2x_3 &\geq 5 \\7x_1 - 2x_2 - 4x_3 &\leq 10 \\6x_1 - 3x_2 + 4x_3 &\geq 4 \\2x_1 + 5x_2 - 3x_3 &= 3 \\x_1, x_2, x_3 &\geq 0\end{aligned}$$

(4 marks)

Question 5:

(A)

The profit for the year of Garena Ltd. works out to 12.5% of the capital employed and the relevant figures are as under:

Sales	Rs. 5,00,000
Direct Materials.....	Rs. 2,50,000
Direct Labour.....	Rs. 1,00,000
Variable Overheads.....	Rs. .40,000
Capital Employed	Rs. 4,00,000

The new Sales Manager who has joined the company recently estimates for next year a profit of about 23% on capital employed, provided the volume of sales is increased by 10% and simultaneously there is an increase in Selling Price of 4% and an overall cost reduction in all the elements of cost by 2%.

Required

Find out by **computing in detail the cost and profit for next year**, whether the proposal of Sales Manager can be adopted. (5 marks)

(B)

Edward Ltd. manufactures weighing machines of standard size and sells its products to two industrial customers namely MT Ltd. and KG Ltd. and to a dealer MG Bros. having shops in different cities. The maximum retail price per unit of weighing machine is Rs. 11,000 and per unit average cost of production is Rs. 5,500 (40% is general fixed overhead cost).

The Finance Officer has been asked to undertake a customer profitability analysis and calculate and compare the profit margin per customer (before deducting general fixed overhead) to know about the real customer profitability.

Following are the additional overhead information:

Delivery costs	Rs. 200 per kilometer
Emergency delivery cost (in addition to delivery cost)	Rs. 21,000 per delivery
Order processing cost	Rs. 6,000 per order
Specific discount and sales commission	As per negotiation
Product Advertisement cost	Actual cost

The following data are available for each customer.

Particulars	MT Ltd.	KG Ltd.	MG Bros.
Sales (in units)	2,000	1,000	800
Total delivery kilometer travelled	1,000	800	900
No. of emergency delivery	2	1	0
No. of orders processed	4	2	8
Specific Discount (percentage of sales revenue)	25%	20%	15%
Sales Commission (percentage of sales revenue)	15%	10%	5%
Advertisement Costs (Rs.)	8,75,000	6,15,000	4,30,000

You are required to analyse the **profitability for each customer**, which customer is the most profitable. **(7 marks)**

(C)

Answer the following independent situation relating to an **assignment problem** with a minimization objective:

- (i) Just after row and column minimization operations, we find that a particular row has two zeros. Does this implies that the 2 corresponding numbers in original matrix before any operation were equal? Why?
- (ii) Under the usual notation, where A_{32} means the element at the intersection of the 3rd row and 2nd column, we have, in a 4×4 assignment problem, A_{24} and A_{32} figuring in the optimal solution. What can you conclude about the remaining assignment? Why? **(4 marks)**

Question 6:

(A)

KYC Toys Ltd. manufactures a single product and the **standard cost system** is followed.

Standard cost per unit is worked out as follows:

	Rs.
Materials (10 Kgs. @ Rs.4 per Kg)	40
Labour (8 hours @ Rs.8 per hour)	64
Variable overheads (8 hours @ Rs.3 per hour)	24
Fixed overheads (8 hours @ Rs.3 per hour)	24
Standard Profit	56

Overheads are allocated on the basis of direct labour hours. In the month of April 2018, there was no difference between the budgeted and actual selling price and there were no opening or closing stock during the period.

The other details for the month of April 2018 are as under

	Budgeted	Actual
Production and Sales	2,000 Units	1,800 Units
Direct Materials	20,000 Kgs. @ Rs. 4 per kg	20,000 Kgs. @ Rs. 4 per kg
Direct Labour	16,000 Hrs. @ Rs. 8 per Hr.	14,800 Hrs. @ Rs. 8 per Hr.
Variable Overheads	Rs. 48,000	Rs. 44,400
Fixed Overheads	Rs. 48,000	Rs. 48,000

Required

Reconcile the budgeted and actual profit with the help of variances according to each of the following method:

- (i) The conventional method
- (ii) The relevant cost method assuming that
 - (a) Materials are scarce and are restricted to supply of 20,000 Kgs. for the period.
 - (b) Labour hours are limited and available hours are only 16,000 hours for the period.
 - (c) There are no scarce inputs.

(8 marks)

(B)

Finance Controller of Dunk Limited has drawn the following projections with probability distribution:

Raw Material		Wages & Other Variable Overheads		Sales	
Rs. in '000	Probability	Rs. in 000	Probability	Rs. in 000	Probability
08 – 10	0.2	11 – 13	0.3	34 – 38	0.1
10 – 12	0.3	13 – 15	0.5	38 – 42	0.3
12 – 14	0.3	15 – 17	0.2	42 – 46	0.4
14 – 16	0.2			46 – 50	0.2

Opening cash balance is Rs. 40,000 and fixed cost is estimated at Rs. 15,000 per month.

Required

Simulate cash flow projection and expected cash balance at the end of the sixth month. Use the following single digit random numbers.

Raw Material	4 3 1 0 4 6
Wages & Other Variable Overheads	2 7 9 1 8 9
Sales	0 6 6 0 2 8

(6 marks)

(C)

Pick out from each of the following items, costs that can be classified under **'committed fixed costs' or 'discretionary fixed costs'**.

- a. New advertisement for existing products is recommended by the Marketing Department for achieving sales quantities that were budgeted for at the beginning of the year.
- b. Rents paid for the factory premises for the past 6 months and the rents payable for the next six months. Production is going on in the factory.

(2 marks)

Question 7:

(A)

State the appropriate **pricing policy** in each of the following independent situations:

- (i) 'W' is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.
- (ii) 'X' is a new product for the company, but not for the market. X's success is crucial for the company's survival in the long term.
- (iii) 'Y' is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the usual sources of capital have uncertainties blocking them.
- (iv) 'Z' is a perishable item, with more than 80% of its shelf life over. **(4 marks)**

(B)

What are the essential requirements for implementing **performance budgeting**?

(4 marks)

(C)

6,000 pen drives of 2 GB to be sold in a perfectly competitive market to earn Rs. 1,06,000 profit, whereas in a monopoly market only 1,200 units are required to be sold to earn the same profit. The fixed costs for the period are Rs. 74,000. The contribution per unit in the monopoly market is as high as three fourths its variable cost. Determine the **targets selling price per unit** under each market condition. **(4 marks)**

(D)

ABC Ltd. is planning to introduce **Kaizen Costing** approach in its manufacturing plant. State whether and why the following are valid or not in respect of Kaizen Costing.

- (i) VP(Finance) is of the view that company has to make a huge initial investment to bring a large scale modification in production process.
- (ii) Head (Personnel) has made a point that introduction of Kaizen Costing does not eliminate the training requirement of employees.
- (iii) General Manager (Manufacturing) firmly believes that only shop floor employees and workers' involvement is prerequisite of Kaizen Costing approach.
- (iv) Manager (Operations) has concerns about creation of confusion among employees and workers regarding their roles and degradation in quality of production. **(4 marks)**